Math 212
Quiz 13

W 21 Sep 2016

Your name: _____

Exercise

(2 pt) Let $f : \mathbf{R}^n \to \mathbf{R}$ and $u, v : \mathbf{R} \to \mathbf{R}$ be differentiable functions.

(a) (1 pt) Let $n = 1$. Use the chain rule to write $\frac{d}{dt} f(u(t))$. *Hint:* Single-variable calculus.

Solution: By the chain rule for single-variable functions,

$$\frac{d}{dt} f(u(t)) = f'(u(t))u'(t).$$

(b) (1 pt) Let $n = 2$. Use the chain rule to write $\frac{d}{dt} f(u(t), v(t))$. *Hint:* If you don't know what the answer is, try to reason what it "should" be.

Solution: By the chain rule for multivariable functions,

$$\frac{d}{dt} f(u(t), v(t)) = \frac{\partial f}{\partial u}(u(t), v(t))u'(t) + \frac{\partial f}{\partial v}(u(t), v(t))v'(t).$$